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Analytical synthesis of reduced order observer for estimation of the bilinear dynamic system state

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Abstract

© 2017 IEEE. The problem of analytical synthesis of the reduced order state observer for the bilinear dynamic system with scalar input and vector output has been considered. Formulas for calculation of the matrix coefficients of the nonlinear observer with estimation error asymptotically approaching zero have been obtained. Two modifications of observer dynamic equation have been proposed: the first one requires differentiation of an output signal and the second one does not. Based on the matrix canonization technology, the solvability conditions for the synthesis problem and analytical expressions for an acceptable set of solutions have been received. A precise step-by-step algorithm for calculating the observer coefficients has been offered. An example of the practical use of the developed algorithm has been given.

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Keywords

bilinear dynamic system, matrix canonization, state observer

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